

REPORT ON THE DISCUSSIONS OF THE FNAL MAGNET ACCEPTANCE COMMITTEE W/RESPECT TO LQXB03

The Fermilab magnet acceptance committee met on 10 June 2003, and thereafter through emails and follow up meetings, to review and discuss the magnet assembly LQXB03 with respect to the acceptance criteria. A summary of the comparison between the results and the criteria are presented in the summary table.

The magnet acceptance committee concludes the magnet is ready to ship. As mentioned in LQXB01, several criteria should be reviewed for their necessity and the data accumulated to date is being reviewed for that purpose. The committee believes with respect to alignment of LQXB03 the final adjustment should be made at CERN (by Fermilab personnel if necessary) in conjunction with the SSW measurements on the magnet at that time.

LQXB03 (MQXB05, MQXB06) ACCEPTANCE CRITERIA SUMMARY

require- ment	description	status (comment)	responsible party (or designee)	reported by
2.1.1	MQXB MECHANICAL TWIST AND STRAIGHTNESS	pass	rb	rb
2.1.2	MQXB COIL RINGING	pass	rb/sf	rb
2.1.3	THERMOMETER AND WARM UP HEATER INSTALLATION	pass	rb	rb
2.1.4	BUS WORK CHECKOUT	ok	rb	
2.1.5	ROOM TEMPERATURE HIPOT	ok	rb/ml	ml
2.1.6	ROOM TEMPERATURE ELECTRICAL CHECKOUT	ok	rb/ml	ml
2.1.7	PRESSURE TEST DOCUMENTATION	done	tn/tp	tp
2.1.8	LEAK CHECK DOCUMENTATION	done	tn/tp	tp
2.1.9	CRYOSTAT SAFETY DOCUMENTATION	done	tn/tp	tp
2.1.10	PIPE ASSEMBLY DOCUMENTATION	accept*	tn/tp	tn
2.1.11	WARM CRYOSTAT TO MAGNETIC AXIS REFERENCE	done	ps	ps
2.2.1	COLD INSTRUMENTATION CHECK OUT	ok	ml	ml
2.2.2	COLD HEATER CHECKOUT	ok	ml	ml
2.2.3	COLD ELECTRICAL HIPOT	ok	ml	
2.2.4	NO QUENCHING UP TO AND INCLUDING OPERATING GRADIENT (AFTER TRAINING)	done	ps	ps
2.2.5	NO TRAINING DEGRADATION AFTER FULL ENERGY DEPOSITION TRIP	dropped from test plan	ps	ps
2.2.6	TRANSFER FUNCTION	pass	ps	ps
2.2.7	INTEGRATED COLD HARMONICS	accept*	ps	ps
2.2.8	COLD ALIGNMENT	accept*	ps	ps

DISCUSSION ON SURVEYED PIPE LOCATIONS:

(Section 2.1.10): For all the lines where the tubes are out of tolerance (with the exception of the V line – see below), neither the assembly of the interconnect flanges on the neighboring magnet assembly (including the interconnect pipe section which spans the ~1m gap between the two), nor the allowable motion due to the desired alignment of the magnets in the tunnel, nor the lifetime of the bellows associated with each individual tube are expected to be limited. We are reviewing the collected LQXB data to come up with more realistic targets.

For the V line, the deviation is consistent with the magnetic axis shift between the magnets. A final optimization of the magnetic axes of the two magnets will need to be done at CERN, before installation in the LHC tunnel. The warm measurement of the magnetic axes using the SSW at CERN will be done as a matter of course for all the magnets in any event, to check for any motions which may occur during shipping. We suggest that Fermilab personnel be present during that process, and optimize the magnetic position at that time.

DISCUSSION ON COLD HARMONICS:

(Section 2.2.7): The skew decapole and dodecapole at injection have some hysteresis placing them beyond 3 sigma. This was seen in the skew decapole as well in LQXB01. The higher order multipoles beyond 3 sigma at injection are likely due to measurement error.

DISCUSSION ON COLD ALIGNMENT:

(Section 2.2.8): The discrepancy in the magnetic axes of the two MQXB is relatively large. We recognized the cold masses should be adjusted but chose not to do so before shipping. We suggest that this be done at CERN in conjunction with warm SSW measurement as well. Fermilab will provide the expertise and labor to do the adjustment if necessary. (See also the discussion on surveyed pipe locations.) Adjustment at CERN will also allow for compensation of changes in magnet positions during shipping, if any.

The cold bore position with respect to the warm magnetic axis is reported on the ID Card. The deviations are relatively large particularly at the IP end consistent with the IP end pipe survey data.

There is a warm to cold shift of the magnetic axis of +0.028mm in X and -0.204mm in Z, all data to date suggest that the cold bore tracks the magnetic axis well.

OTHER:

The ID card for LQXB03 has been completed and is being transmitted separately.